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Philosophical Transactions

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An Account of a Book.

Several TRACTS written by the Honourable Robert Boyle; of the strange Subtilty, Efficacy, and determinate Nature of EFFLUVIUM'S; of New experiments to make the parts of FIRE and FLAME Stable and Ponderable; together with some Additional Experiments about Arresting and Weighing of Igneous corpuscles; as also a Discovery of the Perviousness of Glass to Ponderable parts of Flame, with some Reflexions on it by way of Corollary.

How important these *New Tracts* are to natural Philosophy, the Considering Reader will soon find upon an attentive perusal of them.

In the *First* of which, touching *Effluvia*, he will meet, *First*, with divers Experiments and Observations, proving their wonderful *Subtilty*, and referible to one of the following Heads: *viz.* The strange Extensibility of some Bodies whilst their parts yet remain tangible: The multitude of visible corpuscles that may be afforded by a small portion of matter: The smallness of the Pores at which the *Effluvia* of some Bodies will get in: The small decrement of Bulk or Weight, that a Body may suffer by parting with great store of *Effluvia*: The great quantity of space that may be filled, as to sense, by a small quantity of matter when rarified or dispersed.

Secondly, with several Considerations, evincing the great *Efficacy* of *Effluvia*, notably operating upon one another, by at least *six* ways: 1. By the *Great Number* of emitted corpuscles. 2. By their *penetrating* and pervading nature. 3. By their *Celerity*, and other modification of their Motion. 4. By the *Congruity* and *Incongruity* of their Bulk and Shape to the Pores of the Bodies they are to act upon. 5. By the *Motions* of one part upon another, that they excite or occasion in the Body they work upon according to its structure. 6. By the *Fitness* and *Power* they have to make themselves to be *assisted* in their working by the *more Catholick Agents* of the Universe.

Thirdly, with particular Instances of the *Determinate nature* of Effluvia, reduced to three Heads. 1. That these *Effluvia* being by Condensation or otherwise re-united, they appear to be of *the same* nature with the Body that emitted them. 2. We may discover their *Determinate nature* by the difference that may sometimes be observ'd in their Sensible Qualities; forasmuch as those *Effluvia* that are endowed with them, proceed from the same sort of Bodies, and yet those afforded by one kind of bodies, being in many cases manifestly differing from those that fly off from another, this evident disparity in their exhalations argues their retaining distinct natures, according to those of the respective Bodies whence they proceed. 3. We may discover this *Determinate nature* of Effluvia from their Effects upon other Bodies than the Organs of our Senses; considering, that the Effects which certain Bodies produce on others by their Effluvia, being constant and determinate, and oftentimes very indifferent from those, which other Agents by their Emissions work upon the same and other subjects, the distinct nature of the Corpuscles emitted may be thence sufficiently gathered. The instances produced to make out this particular, are concluded with an Experiment shewing to the very Eye, That *Effluvia* elevated without the help of Heat, and wandering in the Air, may *both* retain their own nature, and upon *Determinate Bodies* produce effects, that a vulgar Philosopher would ascribe to *Occult Qualities*.

In the *second Treatise*, containing *New Experiments to make the Parts of Fire and Flame stable and ponderable*, the Noble author himself acquaints us with the Motive, Design, and Parts thereof. He consider'd then, that there being a very vast disproportion between the Diaphanous part of the World, and the Globes swimming therein; and the nature of Diaphanous bodies being such, that when the Sun or any other Luminous Body illustrates them, the Light does so penetrate and mix it self *per minima* with them, that there is no sensible part of the transparent Body un-illumin'd; it would be worth the enquiry, Whether a thing so vastly diffused as *Light* is, were something Corporeal or not; and

and whether, in case it be, it might be subjected to some other of our Senses besides our *Sight*, whereby we might examine, whether it had any affinity with other Corporeal Beings that we are acquainted with here below ?

He further taking notice of the Disputes between the *Peripatericks*, *Cartesians*, and *Atomists* of old, concerning the nature of Light, whether it be a meer Quality, or a Modification of Motion in an *Æthereal* matter, or a Corporeal substance; and doubting, Whether the Corporeity of Light would be in hast determin'd by meer *Ratiocinations*: He thought it very well worth the endeavouring to try, Whether he could do any thing towards clearing the dispute of it by *Experiments*; especially being perswaded, that, if such an attempt should prove successful, the consequences of it would be very great and useful towards the explicating of divers *Phænomena* in divers parts of Natural Philosophy, as in *Chymistry*, *Botanicks*, and, (if there be any such) the allowable part of *Aërology*.

Now to compass what he aimed at, he intended *first* to try, what he could do by the *Union of Sun-beams*; and then, what could be obtain'd from *Flame*. But having been hitherto disappointed by the cold and wet weather from prosecuting his attempts with the *Sun beams*, so far at least as to build on them as yet, and therefore reserving an account of them for another opportunity; he recites in this Essay that sort of Experiments, which depending less on Casualties, 'twas more in his power to bring to an issue, *viz.* those made with *Flame*; of which he hath delivered a good number, willing to contribute something towards the History, that now perhaps will be thought fit to be made of the Increase or Decrement, that particular Bodies may receive by being exposed to the Fire; considering also, that the Incongruity of the Doctrine here asserted to the Opinions of the Schools, and the general Prepossessions of Mankind, made it fit by a considerable variety and number of Experiments to obviate, as far as might be, the differing Objections and Evasions, wherewith a Truth so paradoxical may expect to be excountred. Certain it is, that this Discovery cannot but excite the Inquisitive to exercise their sagacity in finding out, what kind
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of substance that is, which, though hitherto overseen, and being a Fluid far more subtile than visible Liquors, and able to pierce into the Compact and Solid bodies of Metals, can yet add something to them, that has no despicable weight upon the Ballance, and is able for a considerable time to continue fixt in the Fire.

This part is follow'd by some *Additional Experiments* about *Arresting* and *Weighing of Igneous Corpuscles*; which since they shew, that what is afforded by Fire may in a corporeal way invade, adhere, and add Weight to even fixt and ponderous Bodies, do thereby open a large field to the Speculative to apply this discovery to divers *Phænomena* of Nature and Chymistry.

After this he proceeds to another Discovery, which is of the *Perviousness of Glass to Ponderable Parts of Flame*. And here, that he might not only obviate some scruples that may be entertain'd by suspicious Wits upon that Circumstance of the preceding Additional Experiments, viz. *That the Glasses employed about them were not exposed to the action of meer Flame, but were held upon Charcoals*; which may seem to contain but a grosser kind of Fire; but also that by diversifying the way of tryal, he might render such Experiments *both* more fit to afford Corollaries, and more serviceable to his other purposes; He attempted to make it succeed with a Body so thin and disengaged from gross matter, as meer Flame is allow'd to be, knowing, that by going cautiously with it to work, one might handle a Retort without breaking it, in spite of a violent agitation of kindled matter.

Meantime, by the Experiments here recited concerning this argument, the Author pretends not to make out the *Porosity of Glass* any further, than is exprest in the Title of this Discours, namely, in reference to some of the *Ponderable Parts of Flame*. For he thinks not Glass to be easily penetrable, either by Chymical Liquors, or by Quicksilver, or at least by our Air. Again, having compared the increase, he observ'd to be made in the Weight of the Bodies expos'd by him to the naked Fire, and those of the same or the like kind, included by him in Glasses, or so much as in Crucibles; he esteems it worth considering, Whether this difference in acquired Weight may
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not give cause to suspect, that the Corpuscles, whereof Fire and Flame consists, are not all of the same size, and equally agitated, but that the interposed vessel keeps out the grosser particles like a strainer, though it lets pass the minutest and most active? He further offers it to consideration, Whether the Perviousness of Glass, even to the minute particles that pervade it, and their adhesion to the metal they work on, does necessarily imply Pores *constantly* great enough to transmit such Corpuscles? Or, Whether it may not be said, *that* Glass is generally of a closer texture, than when in his Experiments the Pores are opened by the vehement heat of the Flame that beats upon it, and in that State may let pass corpuscles, too big to permeate Glass in its ordinary State; and *that* this penetration is much assisted by the vehement agitation of the igneous parts, which by the rapidness of their motion both force themselves a passage through the narrow Pores of the glass, and pierce deep enough into those of the included body to stick fast there.

But by all these Experiments the Author professes himself not to be so far satisfied, as *either* to determine, whether the rectitude, by some supposed in the Pores of Glass as 'tis a transparent body, or rather in their ranks or rows, may facilitate the Perviousness by him observ'd in Glass, *or* to conclude from them, that Ponderable parts of Flame will be able as well to pass through the Pores of Metallin vessels as those of Glass.

Having given these Advertisements, to prevent the drawing of unsafe consequences from his Experiments, he subjoins three or four *Corollaries* that may more warily be deduced from them. The *first* confirms, that Flame may act as a *Mens Aruum*, and make Coalitions with the bodies it works on. The *second* proposeth a Paradox about *Calcination* and *Calces*. The *third* shews, that neither the *Epicurean* hypothesis, supposing a penetration of the igneous particles through the Pores of the Glass; nor the *Cartesian* doctrine, teaching the operation of the fire to be perform'd by the vehement agitation of the small parts of the glass, and by them propagated to the included bodies; that neither of these, *I say*, do seem to hit the mark. The *fourth*, That bodies very spirituous, fugi-

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tive and minute, may, by being associated with congruous particles, though of quite an other nature, so change their former Qualities, as to be arrested by a solid and ponderous body, to that degree as not to be driven away from it by a fire intense enough to melt and calcine metals.

Advertisement.

The Reader is herewith desired to take notice, that the next of these Transactions will not appear abroad till about the end of October next.

Errata left uncorrected in N^o. 95.

Pag. 6060. l. 16. r. *Cerebellum*. Pag. 6062. l. 1. r. *within the*.
Pag. 6068. l. 16. r. 12. d. Pag. 6069. l. 5. r. *Evolution*.
Pag. 6070. l. 15. r. *he premiseth*. Pag. 6071. l. 1. r. *and having*.
ibid, l. 24. r. *Ricciolus*. Pag. 6074. l. 11. r. *Models*.

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Pag. 6081. l. 42. r. *propiores*. Pag. 6082. l. 13. r. *huic malo apparenti*. *ibid*. l. 37. r. *& relatum*. *ibid*. l. 44. r. *cum Orthographicè*, pro, *Geographicè*. Pag. 6096. l. 1. r. *secundam*.

L O N D O N,

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